



SEQUENCE LISTING

<110>	IZUI, MASAKO
	SUGIMOTO, MASAKAZU
	KURAHASHI, OSAMU
	NAKAMATSU, TSUYOSH
<120>	DNA ENCODING SUCRO

OSE PTS ENZYME II

<130> 217677US0PCT

<140> US 10/019,284

<141> 2002-01-02

<150> JP 11-189512

<151> 1999-07-02

<160> 21

<170> PatentIn version 3.1

<210> 1

<211> 5969

<212> DNA

<213> Brevibacterium lactofermentum

<220>

<221> CDS

<222> (3779)..(5761)

<223>

<400> 1 agtccgtcga	cgccaccatt	gatgtggtgg	tcaccgagct	tgcggaggct	ttctacatct	60
acgctcccgt	cggcgtggag	tggggtcatt	acgggtggga	tcacgccggt	gaaagttgcg	120
gaacccatgg	tgttccttgt	gggttgaggg	aacgagtgcg	ggtgagaagt	ttttcaagtg	180
tctgcagttt	ttaagttatg	catcatcagc	ttggaaggct	gaggtaattc	agtagacctg	240
caacagcagg	cctcaagtcc	gaagataatt	aacctagatc	cgtagacata	agacatcata	300
cgtcctatgc	ttgctggaag	gaaccaaata	acctcagaaa	gatggcagaa	gtggtgcatt	360
atcaagaaaa	tgcaggtcaa	gcagttaaaa	aaattgaggg	aagaattgtt	cccccctcg	420
gggtgattga	tggctttctc	caactcgaaa	acggcatcat	cacggaactc	tctggagaac	480
cagcacctaa	aaacgcagga	ttccaccccg	aactccccac	gattgttccc	ggttttattg	540
atcttcataa	tcacggtgga	aacggtggcg	cgtttcctac	gggaacgcag	gaccaggcga	600
ggaacaccgc	gcagtatcac	cgcgaacatg	gcacgaccgt	gatgttgcca	agcatggttt	660
cggcgccggc	tgacgcactg	gcagcgcagg	tggaaaacct	tattcccttg	tgtgaagagg	720
tcctgctgtg	cggcattcac	ctcgagggcc	ctttcatcaa	cgcatgccgt	tgtggtgctc	780

aaaacccgga	tttcattttt	cccggcaacc	caacagatct	tgcccgggtg	atccatgcgg	840
gaaaaggttg	gatcaaatcg	atcacagtag	cgccggaaac	tgacaatctt	tctgagcttc	900
tcgatctctg	cgcagcgcac	cacatcattg	cttccttcgg	gcacactgat	gcagattttg	960
ataccactac	cagcgcaatt	gccttggcta	aagagaaaaa	tgtgacggtc	acggctacgc	1020
atttgttcaa	tgcgatgcct	ccgctgcatc	atagggctcc	cggcagcgtg	ggcgctttgc	1080
ttgctgcggc	acgtgccggg	gacgcatatg	ttgagttgat	cgccgacggc	gtgcatttgg	1140
ccgatggaac	ggtcgatcta	gctcgttcca	acaacgcctt	tttcatcacg	gacgccatgg	1200
aagccgccgg	aatgccagac	ggtgagtaca	ttttgggcgt	tttgaacgtc	accgtcaccg	1260
atggagtcgc	ccgtctgcgc	gatggcggcg	ccatcgccgg	gggcaccagc	acactagcga	1320
gtcagttcgt	gcaccacgtg	cgcaggggta	tgacgcttat	cgacgcgacc	ctccacacct	1380
caaccgtcgc	cgctaaaatt	ctcggtcttg	gcgatcacga	aatcgctaaa	tccaaccctg	1440
caaattttgt	ggtctttgac	tcaaacggcc	aggtgcaaaa	ggtccattta	ggtcatcaag	1500
tactttaagt	acgagtaaaa	ctatcctgat	tttaaaggag	tcccaccatg	gaaatcacta	1560
tctgcaaaga	cgagcaagaa	gtcggcaaag	cagttgcagt	cctaatcgca	cccttcgcca	1620
acaagggtgg	aaccttgggg	cttgcaacag	gatcctcacc	actgagtacc	taccaagagc	1680
tcattcgcat	gtatgaagct	ggggaagtgt	cattcaagaa	ctgcaaggca	ttcttgttgg	1740
atgaatacgt	gggactaacc	cgtgacgatg	aaaacagcta	ctttaaaacc	attcgcaaag	1800
agttcactga	ccacatcgac	atcgttgatg	aagaggtcta	cagcccagat	ggtgcaaacc	1860
ctgatccata	cgaagcagct	gcagagtatg	aggcaaagat	cgctgcagaa	tccgttgaag	1920
ttcaaatcct	tggcatcggc	ggaaacggca	catcgctttc	attgaaccat	catcttctct	1980
gtcaggactg	acaaaggtcc	aggcgctgca	ccctaaaact	gtggaggaca	acgctcgatt	2040
cttcaacacc	atcgaagagg	tcccaaccca	cgccgtcacc	cagggtttgg	gcactttgtc	2100
ccgcgcgcaa	aacatcgtgt	tggtggcaac	tggtgaagga	aaagccgacg	ccatccgcgg	2160
aactgtggaa	ggcccagtga	ctgcttcttg	cccaggttcc	atcctgtaga	tgcacaacat	2220
gccaccatca	ı tegttggatg	aagcagcagt	atccaagctg	gaaaacgctg	atcactaccg	2280
tctcatggag	g caattaaagc	: tgcgctagaa	acaaaaagga	aagtactgtg	tggggctatg	2340
cacacagaad	tttccagttt	gegeeetgeg	taccatgtga	ctcctccgca	gggcaggctc	2400
aatgatccca	a acggaatgta	cgtcgatgga	gataccctcc	acgtctacta	a ccagcacgat	2460

ccaggtttcc ccttcgcacc aaa	gcgcacc ggctgggctc	acaccaccac gccgttgacc	2520
ggaccgcagc gattgcagtg gac	gcacctg cccgacgctc	tttacccgga tgcatcctat	2580
gacctggatg gatgctattc cgg	tggagcc gtatttactg	acggcacact taaacttttc	2640
tacaccggca acctaaaaat tga	.cggaaag cgccgcgcca	cccaaaacct tgtcgaagtc	2700
gaggacccaa ctgggctgat ggg	cggcatt catcgccgtt	cgcctaaaaa tccgcttato	2760
gacggacccg ccagcggttt cac	accccat taccgcgato	c ccatgatcag ccctgatggt	2820
gatggttgga acatggttct tgg	ggcccaa cgcgaaaacc	c tcaccggtgc agcggttcta	a 2880
taccgctcga cagatcttga aaa	ctgggaa ttctccggtg	g aaatcacctt tgacctcagt	2940
gatgcacaac ctggttctgc tcc	etgatete gtteeegate	g gctacatgtg ggaatgccc	3000
aaccttttta cgcttcgcga tga	aagaaact ggcgaagato	c tcgacgtgct gattttctg	3060
ccacaaggat tggaccgaat cca	acgatgag gttactcact	t acgcaagete tgaccagtg	c 3120
ggatatgtcg tcgacaagct tga	aaggaacg accttccgc	g tettgegagg atteagega	g 3180
ctggatttcg gccatgaatt cta	acgcaccg caggttgca	g taaacggttc tgatgcctg	g 3240
ctcgtgggct ggatggggct gcc	ccgcgcag gatgatcac	c caacagttgc acaggaagg	a 3300
tgggtgcact gcctgactgt gc	cccgcaag cttcatttg	c gcaaccacgc gatctacca	a 3360
gageteette teecagaggg gg	agtcgggg gtaatcaga	t ctgtattagg ttctgaacc	t 3420
gtccgagtag acatccgagg ca	atatttcc ctcgagtgg	g atggtgtccg tttgtctgt	g 3480
gatcgtgatg gtgatcgtcg cg	tagctgag gtaaaacct	g gcgaattagt gatcgcgga	ac 3540
gataatacag ccattgagat aa	ctgcaggt gatggacag	g tttcattcgc ttttccggg	JC 3600
cttcaaaggt gacactattg ag	agataagt catataaaa	ig ggtettttgt ggegaatte	jt 3660
acaaatactt cgcaaaatcc ct	tgatcgga cacaaataa	aa caggtttaat attgtttag	gc 3720
ttttgaacaa acattcatgt ct	gaatattt ttgtttctt	c ccggttaagg agaaattc	3778
atg gac cat aag gac ctc	gcg caa cgc atc ct	g cgc gac att ggc ggc	3826
Met Asp His Lys Asp Leu 1 5	Ala Gln Arg Ile Le 10	eu Arg Asp lie Gly Gly 15	
gaa gac aac att gtc gcc	gcc gca cac tgt gc	ca acg cgt tta cgc ctc	3874
Glu Asp Asn Ile Val Ala	Ala Ala His Cys Al 25	30	
gtg ctc aaa gac acc aag	gat gtg gat cgc ca	aa agt ctg gat gat gat	3922
Val Leu Lys Asp Thr Lys 35	Asp Val Asp Arg G	ln Ser Leu Asp Asp Asp 45	
cca gat ctg aaa ggc acc	ttt gaa act ggc gg	gc atg ttc cag atc atc	3970

Pro A	o Zsp	Leu	Lys	Gly '	Thr	Phe(55	Glu	Thr	Gly	Gly	Met 60	Phe	Gln	Ile	Ile	
gtc g Val 0	gly ggg	cca Pro	ggc Gly	Asp	gtg Val 70	gat Asp	cat His	gtt Val	ttc Phe	aaa Lys 75	gaa Glu	ctc Leu	gat Asp	gac Asp	gca Ala 80	4018
acc t	ccc Ser	aaa Lys	gac Asp	atc Ile 85	gct Ala	gtg Val	tcc Ser	aca Thr	gag Glu 90	cag Gln	ctc Leu	aaa Lys	gat Asp	gtt Val 95	gtg Val	4066
gct a	aac Asn	aac Asn	gcc Ala 100	aac Asn	tgg Trp	ttc Phe	agc Ser	cgt Arg 105	gct Ala	gtg Val	aag Lys	gta Val	ttg Leu 110	gcg Ala	gac Asp	4114
att Ile	ttc Phe	gtc Val 115	ccg Pro	ctg Leu	att Ile	cca Pro	atc Ile 120	ttg Leu	gtt Val	ggt Gly	ggc	ggt Gl _y 125	шси	ctc Leu	atg Met	4162
gct Ala	atc Ile 130	aac Asn	aat Asn	gtg Val	ttg Leu	gtt Val 135	gcg Ala	cag Gln	gat Asp	ctg Leu	tto Phe	. 01	ccg Pro	caa Glr	tca Ser	4210
ctg Leu 145		gag Glu	atg Met	ttc Phe	cct Pro 150	cag Gln	atc Ile	agc Ser	ggt Gly	gtt Val	. A10	ga a Gl	g ato u Met	g ato	aac Asn 160	4258
	atg Met	gca Ala	tct Ser	gcg Ala 165	Pro	ttc Phe	gcg Ala	ttc Phe	tto Lev	PIC	a gte	g tt l Le	g gti u Vai	ggt 1 Gl ₂ 17	t ttc y Phe 5	4306
acc Thr	gca Ala	acc Thi	aag Lys	a Arg	ttc Phe	ggt Gly	ggo	aat Asn 185	GI	g tto 1 Pho	c ct e Le	g gg u Gl	c gc y Al 19		c att y Ile	4354
ggt Gly	atg Met	gcg : Ala	a Met	g gtg t Val	tto Phe	cca Pro	aco Thi	с цег	g gti 1 Va:	t aa l As	c gg n Gl	c ta y Ty 20	'I AS	c gt p Va	g gcc 1 Ala	4402
gcc Ala	acc Thr	ate		c gcg r Ala	g ggo a Gly	gaa Glu 215	ı me	g cca t Pro	a at	g tg t Tr	g to p Se 22	T 110	g tt eu Ph	t gg ie Gl	ıt ttg y Leu	4450
gat Asp 225	gtt Va		t ca a Gl	a gct n Ala	ggt a Gly 23	у Ту	c ca r Gl	g gg n Gl	c ac y Th	c gt r Va 23	(T T)	eu P	ct gt ro Va	g ct al Le	g gtg eu Val 240	
		t tg r Tr	g at p Il	t ctq e Lei 24	u Al	a ac	g at r Il	c ga e Gl	g aa u Ly 25	S PI	c ci	tg c eu H	ac aa is Ly	,	ga cto rg Lev 55	4546 1
atg Met	g gg	c ac y Th	t go ir Al 26	a As	c tt p Ph	c ct e Le	g at u Il	c ac e Th 26	I PI	a gt	g t	tg a eu T	111 1	tg c eu L 70	tg cto eu Lei	4594
aco Thi	c gg	c tt y Ph			g tt r Ph	c at e Il	t go e Al	t at .a Il	t gg .e GI	gt co ly P	ca g ro A	ca a la M	tg c	gc t rg T	gg gte rp Val	g 4642 l

275		280	285	
ggt gac ttg ct Gly Asp Leu Le 290	g gca cac ggt au Ala His Gly 295	ned Gin G	ga ctc tat gat tt ly Leu Tyr Asp Ph 300	c ggt ggt 4690 e Gly Gly
cca gtc ggc gg Pro Val Gly G	gt ctg ctt ttc ly Leu Leu Phe 310	ggt ctg g Gly Leu V	tc tac tca cca at al Tyr Ser Pro Il 315	c gtt atc 4738 e Val Ile 320
act ggt ctg c Thr Gly Leu H	ac cag tcc ttc is Gln Ser Phe 325	S bro bro r	itt gag ctg gag ct Tle Glu Leu Glu Le 330	g ttc aac 4786 eu Phe Asn 335
Gln Gly Gly S	cc ttc atc ttc er Phe Ile Phe 40	gca acc g a Ala Thr <i>I</i> 345	gca tcc atg gcc aa Ala Ser Met Ala As 35	
cag ggt gca g Gln Gly Ala A 355	gca tgt ttg gca Ala Cys Leu Ala	a gtg ttc t a Val Phe 1 360	ttc cta gcg aag ag Phe Leu Ala Lys So 365	gt gaa aag 4882 er Glu Lys
ctc aag ggc o Leu Lys Gly I 370	ett gca ggt gc Leu Ala Gly Al 37	a Ser Giy	gtc tcc gct gtt c Val Ser Ala Val L 380	tt ggt att 4930 eu Gly Ile
aca gag cct of Thr Glu Pro 2	gcg atc ttc gg Ala Ile Phe Gl 390	t gtg aac y Val Asn	ctt cgc ctg cgc t Leu Arg Leu Arg T 395	gg ccg ttc 4978 rp Pro Phe 400
tac att ggt Tyr Ile Gly	atc ggt acc gc Ile Gly Thr Al 405	a gct atc a Ala Ile	ggt ggc gct ttg a Gly Gly Ala Leu I 410	tt gca ctc 5026 le Ala Leu 415
Phe Asp Ile	aag gca gtt go Lys Ala Val Al 420	eg ttg ggc La Leu Gly 425	gct gca ggt ttc t Ala Ala Gly Phe I	ttg ggt gtt 5074 Leu Gly Val
gtt tct att Val Ser Ile 435	gat gct cca ga Asp Ala Pro As	at atg gtc sp Met Val 440	atg ttc ttg gtt t Met Phe Leu Val 0 445	tgc gcg gta 5122 Cys Ala Val
gtt acc ttt Val Thr Phe 450	Val Ile Ala Pi	tc ggc gca he Gly Ala 55	gcg att gct tat of Ala Ile Ala Tyr 460	ggc ctt tac 5170 Gly Leu Tyr
ttg gtt cgc Leu Val Arg 465	cgc aac ggc a Arg Asn Gly S 470	gc att gat er Ile Asp	cca gat gca acc Pro Asp Ala Thr 475	gct gct cca 5218 Ala Ala Pro 480
	gga acg acc a Gly Thr Thr L 485	aa gcc gaa ys Ala Glu	gca gaa gca ccc Ala Glu Ala Pro 490	gca gaa ttt 5266 Ala Glu Phe 495
tca aac gat Ser Asn Asp	tcc acc atc a Ser Thr Ile I 500	itc cag gca le Gln Ala 505	cct ttg acc ggt Pro Leu Thr Gly	gaa gct atc 5314 Glu Ala Ile 510

gca ctg agc agc gtc agc gat gcc atg ttt gcc agc gga aag ctt ggc 5362 Ala Leu Ser Ser Val Ser Asp Ala Met Phe Ala Ser Gly Lys Leu Gly 515																	5363
Ser Gly Val Ala Ile Val Pro Thr Lys Gly Gln Leu Val Ser Pro Val 530 535 540 540 550 540 550 540 550 545 545 555 55	gca Ala	ctg Leu	Ser	agc Ser	gtc Val	agc Ser	gat Asp	Ala	atg Met	ttt Phe	gcc Ala	agc Ser	GIY	aag Lys	Leu	Gly	5362
Ser Gly Lys Ile Val Val Ala Phe Pro Ser Gly His Ala Phe Ra Val Sala Phe Ra Val Sala Sala Sala Sala Sala Sala Sala	tca Ser	Gly	gtt Val	gcg Ala	atc Ile	gtc Val	Pro	acc Thr	aag Lys	gly ggg	cag Gln	Leu	gtt Val	tca Ser	cca Pro	gtg Val	5410
Arg Thr Lys Ala Glu Asp Gly Ser Asn Val Asp 11e Leu Met His The 565 ggt ttc gac acc gta aac ctc aac ggc acg cac ttt aac ccg ctg aag acg cag ly Phe Asp Thr Val Asn Leu Asn Gly Thr His Phe Asn Pro Leu Lys 580 aag cag ggc gat gaa gtc aaa gca ggg gag ctg ctg tgt gaa ttc gat Lys Gln Gly Asp Glu Val Lys Ala Gly Glu Leu Cys Glu Phe Asp 605 att gat gcc att aag gct gca ggt tat gag gta acc acg ccg att gtt lasp and all le Lys Ala Ala Gly Tyr Glu Val Thr Thr Pro Ile Val 610 gtt tcg aat tac aag aaa acc gga cct gta aac act tac ggt ttg ggc Val Ser Asn Tyr Lys Lys Thr Gly Pro Val Asn Thr Tyr Gly Leu Gly 640 gaa att gaa gcg gga gcc aac ctg ctc aac gtc gca aag aaa gaa gcg Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 645 gtg cca gca aca cca taagttgaaa ccttgagtgt tcgcacacag gttagactag ggacgtgac tctacgcatc tttgacaccg gtacccgtac gcttcgagat tttaaacctg 5861 ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatet tcacccaca special color of the co	Ser	gga Gly	aag Lys	atc Ile	gtg Val	Val	gcc Ala	ttc Phe	cca Pro	tct Ser	GIY	cac His	gct Ala	ttc Phe	gca Ala	vaı	5458
aag cag ggc gat gaa gtc aaa gca ggg gag ctg ctg tgt gaa ttc gat 5595 sp5 sp5 sp5 sp5 sp5 sp5 sp5 sp5 sp5 sp	cgc Arg	act Thr	aag Lys	gct Ala	Glu	gat Asp	ggt Gly	tcc Ser	aat Asn	Val	gat Asp	atc Ile	ttg Leu	atg Met	HIS	att Ile	5506
Lys Gln Gly Asp Glu Val Lys Ala Gly Glu Leu Leu Cys Glu Phe Asp 600 605 att gat gcc att aag gct gca ggt tat gag gta acc acg ccg att gtt 610 610 615 620 gtt tcg aat tac aag aaa acc gga cct gta aac act tac ggt ttg ggc Val Ser Asn Tyr Lys Lys Thr Gly Pro Val Asn Thr Tyr Gly Leu Gly 625 630 630 635 640 gaa att gaa gcg gga gcc aac ctg ctc aac gtc gca aag aaa gcg Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 650 655 gtg cca gca aca cca taagttgaaa ccttgagtgt tcgcacacag gttagactag 5801 Val Pro Ala Thr Pro 660 gggacgtgac tctacgcatc tttgacaccg gtacccgtac gcttcgagat tttaaacctg 5861 ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatct tcaccccaca 5921 ttggacatgt tcgttcagca gtagcgtttg atattttgcg ccgctgaa 5969 <a href="https://www.dec.ncb.nlm.nih.gen.ncb.nlm.ni</td><td>ggt
Gly</td><td>ttc
Phe</td><td>gac
Asp</td><td>Thr</td><td>gta
Val</td><td>aac
Asn</td><td>ctc
Leu</td><td>aac
Asn</td><td>Gly</td><td>acg
Thr</td><td>cac</td><td>ttt
Phe</td><td>aac
Asn</td><td>Pro</td><td>ctg
Leu</td><td>aag
Lys</td><td>5554</td></tr><tr><td>Ile Asp Ala Ile Lys Ala Ala Gly Tyr Glu Val Thr Thr Pro lie Val 610 615 620 gtt tcg aat tac aag aaa acc gga cct gta aac act tac ggt ttg ggc 5698 Val Ser Asn Tyr Lys Lys Thr Gly Pro Val Asn Thr Tyr Gly Leu Gly 635 640 gaa att gaa gcg gga gcc aac ctg ctc aac gtc gca aag aaa gaa gcg Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 645 650 655 gtg cca gca aca cca taagttgaaa ccttgagtgt tcgcacacag gttagactag 5801 Val Pro Ala Thr Pro 660 gggacgtgac tctacgcatc tttgacaccg gtacccgtac gcttcgagat tttaaacctg 5861 ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatct tcacccaca 5921 ttggacatgt tcgtcagca gtagcgtttg atattttgcg ccgctgaa 5969 <a href=" https:="" td="" www.new.new.new.new.new.new.new.new.new.<=""><td>aag Lys</td><td>cag Gln</td><td>Gly</td><td>Asp</td><td>gaa Glu</td><td>gtc Val</td><td>aaa Lys</td><td>Ala</td><td>Gly 999</td><td>gag Glu</td><td>ctg Leu</td><td>ctg Leu</td><td>Cys</td><td>GIU</td><td>ttc Phe</td><td>gat Asp</td><td>5602</td>	aag Lys	cag Gln	Gly	Asp	gaa Glu	gtc Val	aaa Lys	Ala	Gly 999	gag Glu	ctg Leu	ctg Leu	Cys	GIU	ttc Phe	gat Asp	5602
Val Ser Asn Tyr Lys Lys Thr Gly Pro Val Asn Thr Tyr Gly Leu Gly 625 630 635 640 gaa att gaa gcg gga gcc aac ctg ctc aac gtc gca aag aaa gaa gcg Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 645 650 655 gtg cca gca aca cca taagttgaaa ccttgagtgt tcgcacacag gttagactag 5801 Val Pro Ala Thr Pro 660 gggacgtgac tctacgcatc tttgacaccg gtacccgtac gcttcgagat tttaaacctg 5861 ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatct tcaccccaca 5921 ttggacatgt tcgttcagca gtagcgtttg atattttgcg ccgctgaa 5969 <210> 2 <211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15	att Ile	Asp	Ala	att Ile	aag Lys	gct Ala	Ala	ggt Gly	tat Tyr	gag Glu	gta Val	Thr	Thr	ccg Pro	att Ile	gtt Val	5650
Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 645 gtg cca gca aca cca taagttgaaa cettgagtgt tegcacacag gttagactag Val Pro Ala Thr Pro 660 gggacgtgac tetacgcate tttgacaceg gtaccegtac gettegagat tttaaacetg ttcaaccagg teatgeeteg gtgtacetgt gtggtgecac ecegcaatet teaceccaca 5921 ttggacatgt tegtteagea gtagegtttg atattttgeg eegetgaa 5969 <210> 2 <211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15	Val	Ser	aat Asn	tac Tyr	aag Lys	Lys	Thr	gga Gly	cct Pro	gta Val	Asn	Thr	tac Tyr	ggt Gly	ttg Lev	ı Gıy	5698
Val Pro Ala Thr Pro 660 gggacgtgac tetacgcate tttgacaccg gtacccgtac gettegagat tttaaacctg 5861 ttcaaccagg teatgeeteg gtgtacctgt gtggtgeeac ecegeaatet teaccecaca 5921 ttggacatgt tegtteagea gtagegtttg atattttgeg eegetgaa 5969 <210> 2 <211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15	gaa Glu	att Ile	gaa Glu	gcg Ala	Gly	Ala	aac Asn	ctg Leu	ctc Leu	Asn	val	gca Ala	aag Lys	g aaa E Lys	S GIL	Ala	5746
ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatct tcaccccaca 5921 ttggacatgt tcgttcagca gtagcgtttg atattttgcg ccgctgaa 5969 <210> 2 <211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15	gto Val	cca Pro	gca Ala	Thr	Pro	taa	gttg	aaa	cctt	gagt	gt t	cgca	acaca	ag gt	taga	actag	5801
ttcaaccagg tcatgcctcg gtgtacctgt gtggtgccac cccgcaatct tcaccccaca 5921 ttggacatgt tcgttcagca gtagcgtttg atattttgcg ccgctgaa 5969 <210> 2 <211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15	ggg	jacgt	gac	tcta	cgca	itc t	ttga	cacc	g gt	acco	gtac	gct	tcga	agat	ttt	aaacctg	5861
<pre>cell tegacatgt tegatecagea gragegitig atatitities degrees at the second of the se</pre>																	5921
<pre><211> 661 <212> PRT <213> Brevibacterium lactofermentum <400> 2 Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly 15</pre>	ttg	gaca	atgt	tcgt	tcag	gca <u>c</u>	gtago	gttt	g at	attt	tgc	g cc	gctg	aa			5969
Met Asp His Lys Asp Leu Ala Gln Arg Ile Leu Arg Asp Ile Gly Gly	<2: <2: <2:	L1> L2> L3>	661 PRT Brev	vibac	cteri	ium]	lacto	ofern	nenti	ım							
,	Me		p Hi:	s Lys		p Lev	ı Ala	a Gli	n Arg	g Il	e Le	u Ar	g As	p Il	e Gl 15	y Gly	

Glu Asp Asn Ile Val Ala Ala Ala His Cys Ala Thr Arg Leu Arg Leu 20 25 30

Val Leu Lys Asp Thr Lys Asp Val Asp Arg Gln Ser Leu Asp Asp Asp 35 40 45

Pro Asp Leu Lys Gly Thr Phe Glu Thr Gly Gly Met Phe Gln Ile Ile 50 55 60

Val Gly Pro Gly Asp Val Asp His Val Phe Lys Glu Leu Asp Asp Ala 65 70 75 80

Thr Ser Lys Asp Ile Ala Val Ser Thr Glu Gln Leu Lys Asp Val Val 85 90 95

Ala Asn Asn Ala Asn Trp Phe Ser Arg Ala Val Lys Val Leu Ala Asp 100 105 110

Ile Phe Val Pro Leu Ile Pro Ile Leu Val Gly Gly Leu Leu Met 115 120 125

Ala Ile Asn Asn Val Leu Val Ala Gln Asp Leu Phe Gly Pro Gln Ser 130 135 140

Leu Val Glu Met Phe Pro Gln Ile Ser Gly Val Ala Glu Met Ile Asn 145 150 155 160

Leu Met Ala Ser Ala Pro Phe Ala Phe Leu Pro Val Leu Val Gly Phe 165 170 175

Thr Ala Thr Lys Arg Phe Gly Gly Asn Glu Phe Leu Gly Ala Gly Ile 180 185 190

Gly Met Ala Met Val Phe Pro Thr Leu Val Asn Gly Tyr Asp Val Ala 195 200 205

Ala Thr Met Thr Ala Gly Glu Met Pro Met Trp Ser Leu Phe Gly Leu 210 215 220

Asp Val Ala Gln Ala Gly Tyr Gln Gly Thr Val Leu Pro Val Leu Val 225 230 235 240

Val Ser Trp Ile Leu Ala Thr Ile Glu Lys Phe Leu His Lys Arg Leu 245 250 255

Met Gly Thr Ala Asp Phe Leu Ile Thr Pro Val Leu Thr Leu Leu Leu 260 265 270

Thr Gly Phe Leu Thr Phe Ile Ala Ile Gly Pro Ala Met Arg Trp Val 275 280 285

Gly Asp Leu Leu Ala His Gly Leu Gln Gly Leu Tyr Asp Phe Gly Gly 290 295 300

Pro Val Gly Gly Leu Leu Phe Gly Leu Val Tyr Ser Pro Ile Val Ile 305 310 315 320

Thr Gly Leu His Gln Ser Phe Pro Pro Ile Glu Leu Glu Leu Phe Asn 325 330 335

Gln Gly Gly Ser Phe Ile Phe Ala Thr Ala Ser Met Ala Asn Ile Ala 340 345 350

Gln Gly Ala Ala Cys Leu Ala Val Phe Phe Leu Ala Lys Ser Glu Lys 355 360 365

Leu Lys Gly Leu Ala Gly Ala Ser Gly Val Ser Ala Val Leu Gly Ile 370 375 380

Thr Glu Pro Ala Ile Phe Gly Val Asn Leu Arg Leu Arg Trp Pro Phe 385 390 395 400

Tyr Ile Gly Ile Gly Thr Ala Ala Ile Gly Gly Ala Leu Ile Ala Leu 405 410 415

Phe Asp Ile Lys Ala Val Ala Leu Gly Ala Ala Gly Phe Leu Gly Val 420 425 430

Val Ser Ile Asp Ala Pro Asp Met Val Met Phe Leu Val Cys Ala Val 435 440 445

Val Thr Phe Val Ile Ala Phe Gly Ala Ala Ile Ala Tyr Gly Leu Tyr 450 455 460 Leu Val Arg Arg Asn Gly Ser Ile Asp Pro Asp Ala Thr Ala Ala Pro 465 470 475 480

Val Pro Ala Gly Thr Thr Lys Ala Glu Ala Glu Ala Pro Ala Glu Phe 485 490 495

Ser Asn Asp Ser Thr Ile Ile Gln Ala Pro Leu Thr Gly Glu Ala Ile 500 505 510

Ala Leu Ser Ser Val Ser Asp Ala Met Phe Ala Ser Gly Lys Leu Gly 515

Ser Gly Val Ala Ile Val Pro Thr Lys Gly Gln Leu Val Ser Pro Val 530 535 540

Ser Gly Lys Ile Val Val Ala Phe Pro Ser Gly His Ala Phe Ala Val 545 550 550 560

Arg Thr Lys Ala Glu Asp Gly Ser Asn Val Asp Ile Leu Met His Ile 565 570 575

Gly Phe Asp Thr Val Asn Leu Asn Gly Thr His Phe Asn Pro Leu Lys 580 585

Lys Gln Gly Asp Glu Val Lys Ala Gly Glu Leu Leu Cys Glu Phe Asp 595 600 605

Ile Asp Ala Ile Lys Ala Ala Gly Tyr Glu Val Thr Thr Pro Ile Val 610 615 620

Val Ser Asn Tyr Lys Lys Thr Gly Pro Val Asn Thr Tyr Gly Leu Gly 625 630 635 640

Glu Ile Glu Ala Gly Ala Asn Leu Leu Asn Val Ala Lys Lys Glu Ala 645 650 655

Val Pro Ala Thr Pro 660

<210> 3

<211> 44

<212> DNA

<213> ARTIFICIAL SEQUENCE

<220> <223>	SYNTHETIC DNA	
<400> gtacata	3 attg tcgttagaac gcgtaatacg actcactata ggga	44
<210> <211>	4 47	
	DNA ARTIFICIAL SEQUENCE	
<220> <223>	SYNTHETIC DNA	
<400> gtacat	4 attg tcgttagaac gcgtaatacg actcactata gggagag	47
<210>	, 5	
<211>	46	
··	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	5	1.0
gtacat	tattg togttagaac gogtaataog actoactata gggaga	46
<210>	6	
<211>		
<212>		
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	6	51
gtaca	tattg tcgttagaac gcgtaatacg actcactata gggagactgc a	-
<210>	7	
<211>	47	
<212>		
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	7	47
gtaca	tattg tcgttagaac gcgtaatacg actcactata gggagag	4 /
<210>		
<211>	47	

<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	8	47
gtacata	attg tcgttagaac gcgtaatacg actcactata gggagat	
<210>	9	
<211> <212>	25 DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>	CIDIMITEM IC DNA	
<223>	SYNTHETIC DNA	
<400>	9	25
cgtctt	gcga ggattcagcg agctg	
<210>	10	
<211>	25	
<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	10	25
agctg	gattt cggccatgaa ttcta	23
<210>	11	
<211>		
<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>		
<400>		
gatct	gttcg gtccgcaatc act	23
J =		
<210>	. 12	
<211>		
<212>	DNA	
<213>		
-220-		
<220:		
<400	> 12 ggtgga gatgtteeet cagat	25
Cacto	IULUUA MACGOOOG TEDEE	

<210>	13
<211>	
<212>	
-212-	ARTIFICIAL SEQUENCE
<213>	ARTITICINE SEQUENCE
<220>	
-223	SYNTHETIC DNA
(2237	DINIMETER SAME
<400>	13
catctt	cgca accgcatcca tggcc
	- 5
<210>	14
<211>	24
<212>	DNA ARTIFICIAL SEQUENCE
<213>	ARTIFICIAL SEQUENCE
<220>	
<223>	SYNTHETIC DNA
<400>	
cgcgca	gggt gcagcatgtt tggc
<210>	15
<211>	
<212>	
-212-	ARTIFICIAL SEQUENCE
(213/	Million Degrada
<220>	
	SYNTHETIC DNA
<400>	15
gggcct	tgca ggtgcttcag gtgtc
010-	16
<210>	
<211>	
<212>	ARTIFICIAL SEQUENCE
<213>	ARTIFICIAL SEQUENCE
<220>	
	SYNTHETIC DNA
(2237	
<400>	16
ccact	gttct tggtattaca gagcc
<210>	
<211>	25
<212>	
<213>	ARTIFICIAL SEQUENCE
<220>	
<223>	SYNTHETIC DNA

CE		
gcc		25
CE		
ggc		24
NCE		
tgtc		25
NCE		
agcc		25
NCE		

	17	25
gcagcgt	cag cgatgccatg tttgc	
<210>	18	
<211>	25	
	DNA ARTIFICIAL SEQUENCE	
<213>	ARITHETAD BEGGENGE	
<220>	•	
<223>	SYNTHETIC DNA	
<400>	18	25
gcttgg	ctca ggtgttgcga tcgtc	
<210>	19	
<211>	36	
<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	19	36
gtacat	attg tcgttagaac gcggtaatac gactca	
<210>	20	
<211>	35	
<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220>		
<223>	SYNTHETIC DNA	
<400>	20	35
cgttag	gaacg cgtaatacga ctcactatag ggaga	
<210>	21	
<211>		
<212>	DNA	
<213>	ARTIFICIAL SEQUENCE	
<220> <223>	SYNTHETIC DNA	
<223>	GIMINDITO DAY	
<400>	21	•
	ctgct gaacgaacat gtcc	24